REMARKS

Careful consideration has been given to the Official Action of November 19, 2003 and reconsideration of the application as amended is respectfully requested.

The specification has been amended to provide proper section headings.

The Examiner has rejected claims 1-5 and 8 under 35 U.S.C. § 112 as being indefinite.

Claims 1-9 are rejected under 35 U.S.C. § 103 as being unpatentable over Tonkin in view of King. The Examiner proposes utilizing the engine sensor of King in the system of Tonkin.

The claims have been amended to overcome the rejection under 35 U.S.C. § 112 by eliminating the objections concerning lack of antecedent basis. The claims are now deemed to be free from formal objection.

The claims have also been amended so that they are clearly distinguished from the cited art

The problem solved by the present invention is to provide accurate

information to any driver behind a vehicle during a braking operation. Accuracy should be understood as:

Progression of the lighting information provided proportional to the progression of the speed loss by the vehicle due to the actuation on the brake.

Information should be easily and intuitively appreciated by any driver worldwide without being familiar with a particular code of emergency lights.

Tonkin achieves the solution by finding an alternative solution that is compared herewith as follows:

Fundamental Differences between Tonkin and the Present Invention

In the first embodiment of Tonkin:

Representation of the movement during braking is achieved in which indicator levels are dependent on decreasing and increasing deceleration thresholds.

Dynamic display when v is equal to or less that a fixed V

Static display when d is equal to or less than a fixed G

Parameters involved:

initial velocity

increasing and decreasing deceleration

instantaneous decelerations

constant (A)

speed gain (G)

set of decreasing deceleration thresholds

minimum threshold speed

maximum threshold speed

minimum threshold distance

maximum threshold distance.

Tonkin uses an algorithm $F_{1A} = A + Gv$, linear or not, (solely for calculating the values of the two sets of deceleration thresholds (decreasing and increasing).

In the second and third embodiments of Tonkin:

dynamic display when the speed drops below a fixed minimum threshold speed

static display when the distance drops below a fixed minimum threshold distance.

These embodiments use no algorithm.

It operates with or without intervention of the third brake light and dependent, or not, on whether the vehicle braking system has been acted on.

Parameters include:

initial velocity

instantaneous velocities

minimum threshold velocity

maximum threshold velocity

minimum threshold distance

maximum threshold distance.

In the present invention:

Progressive representation of change of vehicle speed during braking by means of:

progressive illumination of the display with the loss of speed, the progression being from any value of the initial speed up to zero (if reached).

The system only functions when the braking system is actuated or when the derivator circuit indicates it (instantaneous speed peak = abrupt speed reduction by means of engine and gear box).

Parameters include:

initial velocity

instantaneous velocities

number (fixed) of display lights

instantaneous speed derivative.

Uses an algorithm (initial V/ number of lights) to distribute the initial speed between the number of lights (this algorithm does not depend on instantaneous speeds, speed gain, decelerations or accelerations).

CONSEQUENCES AND DIFFERENCES:

In the present invention:

Progression of display illumination from the initial braking speed until zero (if reached).

Greater speed of illumination of the lights of the display when the initial speed is less.

Vehicle stopped by means of the braking system, implies instantaneous $v = 0$ and therefore all of the lights of the display are lit.

If ceasing to act on the brake system the display switches off (with a certain delay).

There are not, and cannot be oscillations of the display illumination during the braking.

There is not, or any need for any type of dynamic or static display.

In contrast to Tonkin, the invention provides the distinctions that:

1. The response (rapidity with which illumination of the display progresses) during braking must be quicker for low initial speeds (since the

distances between vehicles tends to be less) than for high initial speeds (in which the distance between vehicles tends to be greater). In fact, vehicle impacts occur with much greater frequency at low speeds more than at high speeds.

2. The present invention also considers that an intuitive indication recognized worldwide of a stationary vehicle (by intuition and visibility at a distance) is a totally illuminated display at the entire width of the rear part of the vehicle, rather than a pair of fixed lights lit up. The reason is that the indicator of a stationary vehicle in Tonkin (static display with a fixed pair of lights illuminated) could be confused with the third brake light or with the conventional brake indicator lights of any other vehicle that has the conventional brake indicator system. This does not occur in the system of indicating in the present invention.

3. Finally, and what is more important, the invention is totally progressive and intuitive whereas in Tonkin (in the first embodiment) the different display presentations are not intuitive and in the second and third embodiments there are different display presentations (dynamic or static with two fixed lights).

In the invention, the vehicle speed during braking (while acting on the braking system) will always be of a constant or decreasing magnitude. During

the entire braking operation, the difference between the initial velocity and the instantaneous velocity will always be increasing and as a consequence lights will never switch off during braking and the illumination progression will be increasing. The basic feature of the present invention is to represent the vehicle speed and how it varies on acting on the brake system of the vehicle or on carrying out an abrupt reduction in the gear change (loss of speed due to abrupt engine cutoff), at any moment of braking and whatever the initial speed. The system neither uses nor represents accelerations or decelerations because while the speed during braking is clearly a decreasing parameter, accelerations/ decelerations are not.

Tonkin is based on representation of the values of the accelerations/ decelerations during the braking.

With respect to claim 1, Tonkin uses the speed signal to calculate the deceleration, col. 14, lines 35-37 , to calculate, in each case, the extent of the deceleration thresholds ($|F_{1A}|$, ...) col. 20, lines 33-45, to calculate G (speed gain parameter) for each case and to calculate the speed thresholds V_1 and V_2 (Fig. 20).

The ratio in the display is between the value of the deceleration and the number of lights that light up and not, as in the present invention between the value of the vehicle speed at each instant of braking and the number of lights

that light up.

The Examiner cites King in combination with Tonkin in order to provide an rpm sensor which is lacking in Tonkin.

King's display (42) Fig. 1 is solely for information for the driver of vehicle speed (speedometer) or rpm of the engine (tachometer) col. 2, lines 41-43. In King this display is installed in the dashboard of the vehicle and the rear display indicates, as in Tonkin, accelerations/decelerations.

Therefore, since King does not alter the lighting of the rear lights by change of engine rpm it does not follow that it could be used with Tonkin to achieve this purpose as alleged by the Examiner.

With respect to claims 2-3, Figure 1 of Tonkin corresponds to the already indicated representation of the different deceleration thresholds during braking of the vehicle while Figure 2 of Tonkin corresponds to the dynamic display model to indicate the vehicle is stopped.

The lighting up of the lights is therefore proportional, in quantity and rate to the different deceleration values that may be produced during the braking. In the present invention, the lighting up of the lights is proportional in quantity to the values of the speed during braking while their rate depends on whatever rate

the speed values pass through the values of the light-up series determined, for this case, by the microprocessor.

With respect to claim 4. The deceleration is indicated by the number of indicator levels (lights) that light up, col. 5, lines 1-6 of Tonkin. In the present invention, the number of lights illuminated represents the value of the speed at each moment.

With respect to claim 5. The patents cited utilize the signal of the rpm of the engine to calculate the speed and, differentiating this with respect to the time, to obtain the acceleration/deceleration of the vehicle, (See Blomenkamp col. 3, lines 3-5 and 11-13).

With respect to claims 6-7. Coincides, making some allowance inasmuch as Tonkin only contemplates the case of the brightness diminishing when there is little light, and not that of increase when the natural light is strong or the lights of another vehicle strike the display indicator, nor for the case of fog. In the present invention this claim depends on a parent so it should not be considered separately.

With respect to claim 8. Tonkin indicates that the potentiometers (138) are used to set, for each one, a delay time for extinguishment of each deceleration threshold, (col. 19, lines 10-13) to avoid small variations in

acceleration/deceleration giving rise to lighting up and extinguishment of the alert levels indication in the display. In Figure 26 it can be seen how, to each potentiometer, a deceleration threshold corresponds and, therefore, to decrease deceleration levels (col. 19, lines 12-13).

In the present invention the retardation is introduced into the extinguishment of the total indication, once the brake pedal is no longer depressed, to prevent repeated pressing on the brake pedal giving rise to a new light-up series.

With respect to claim 9. In Tonkin the representation which the display provides is totally different from the present invention as explained further on.

Display mode M = 1 mode, in the four levels of alert the number of alert levels and therefore of lights lit increases, with the severity of the deceleration (col. 13, lines 22-44).

In the present invention, the number of lights lit increases as the vehicle loses speed and the rate at which they light up, at each moment, depends on the rapidity with which, at each moment, speed is lost.

Display in the mode M = 2 changes the mode of representation and an animated display is produced to indicate vehicle stopped (col. 13, lines 48-51).

In the present invention, if the vehicle is stopped then its speed is zero and hence the display will be totally lit up (in any light-up series of the system, clearly zero speed corresponds to the entire display being lit up), without therefore the form, mode or concept of the representation changing to be able to indicate that the vehicle is stopped.

In the present invention the rpm of the engine is transmitted to a derivator circuit which calculates the slope of the tangent to the rpm curve. In this way, when the slope corresponds to a vertical, or nearly vertical tangent (an instantaneous peak of the engine rpm has been produced) the circuit provides an interruption of priority 2 in the microprocessor, thus indicating to it to read the speed of the wheel and to process it according to the program for representing the said speed. The signal from the derivator circuit is not processed in any way by the microprocessor (it only provides in the microprocessor an interruption that generates the order to read, to process and represent the speed of the vehicle as though it were braking by means of the vehicle braking system.

Examples which clearly show the differences between the present invention and Tonkin in the representation in the display:

1. If the driver of a vehicle, traveling at a speed of 90mph, brakes with a constant deceleration until the point of stopping, in the systems of Tonkin (and all other prior art) only the alert level will light up, corresponding to the value of this deceleration threshold (the indication will not vary during the whole braking

period due to the constant value of deceleration) and thereafter, in Tonkin, for example, also the dynamic display ($M = 2$) corresponding to the vehicle stopped indication, will light up.

In the present invention, lights will go on, lighting up progressively, from the edges to the center of the display, as the speed values pass through the values of the light-up series determined by the microprocessor (if the display is formed by two segments of 10 lights each, the series of speed values could be; 81, 72, 63, 54, 45, 36, 27, 18, 9 and 0 mph) and with a constant rate due to the speed loss being constant. Clearly, on the speed reaching zero, the whole display will be lit up indicating, without any doubt at all, "vehicle stopped".

2. If the driver of a vehicle, traveling at a speed of 90 mph, brakes abruptly at the beginning of the braking and, thereafter, during the same braking, brakes gently, Tonkin's indication will give rise to the light-up of, for example, two alert levels initially (abrupt deceleration) and then one alert will extinguish on the deceleration subsequently being gentle, only one alert level remaining lit until the vehicle stops or accelerates.

In the present invention, lights will progressively light up corresponding to passage of the instantaneous speed values through the different values of the light up series calculated by the microprocessor and the light-up rate will vary at every moment in the same way as the loss of speed rate varies at each moment

until the vehicle stops or regains speed.

It is therefore respectfully submitted that there is a fundamental distinction between the present invention in which the lights are progressively lit as a function of diminishing vehicle speed or engine rpm reduction whereas Tonkin bases lighting on deceleration and King does not utilize engine rpm to influence brake lighting at all. Consider that according to the invention as the vehicle slows, the lights will progressively light up in direct proportion to speed loss regardless of deceleration rate, whereas in King the lights will light up as a function of deceleration and not of speed.

Therefore, favorable reconsideration and allowance of the claims is earnestly solicited.

Respectfully submitted,

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